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Foreign Direct Investment and Income Inequality revisited[1]

by

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1 This paper is based on a longer study prepared for the „Wissenschaftliche Arbeitsgruppe für weltkirchliche Aufgaben der Deutschen Bischofskonferenz“ [Krüger (2004)].

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Abstract

- This paper discusses the impact of FDI on income inequality.
- The theoretical ways in which FDI might influence income inequality between countries as well as within a given country are discussed, with special attention also given to employment generation effects.
- Revisiting previous research we show that significant effects of FDI are hard to find in more recent work, with older studies showing mixed results.
- Re-estimating the prominent study of Tsai (1995) with newer data we augment it by allowing for FDI-influences on inequality by region, income level, and export focus.
- We find no overall impact of FDI on inequality. Also region and income differentiated estimations show no country group-specific impacts of FDI. Only in the export focus-differentiated estimations we find some evidence of an inequality increasing impact of FDI in countries primarily exporting primary goods (without fuel).
- FDI thus do not have significant implications for income distribution in general.

1. Introduction

Foreign direct investment (FDI) is regarded as one of the main features of globalization and has received growing attention since the early 1990s.
While FDI was described particularly in the 1960's by dependency theory as an important cause of underdevelopment in the Third World, its growth effect today is perceived to be very positive. While FDI is seen as a motor of development in many countries growth-wise, and therefore large efforts are undertaken to attract it, its effect on income distribution and poverty, in contrast, is often described very critically. This is a tendency despite the overall consensus on growth being the single most important factor of poverty reduction.[3] The inequality-raising effects of FDI are seen as more than compensating the poverty-lowering growth effect.
This paper examines the effect of FDI on income inequality both theoretically and empirically. In section 2 the theoretical foundation is laid, concentrating on the ways FDI can have an impact on the income distribution between and within countries, and on employment generating effects of FDI. Section 3 cites some previous empirical findings and sections 4 and 5 provide our own empirical assessment of the influence of FDI on income distribution measured by the Gini coefficient, extending a previous study by Tsai [1995]. Special attention is given to effects of FDI in different country groups differentiated by region, income and export focus. Section 6 concludes.

2. Theoretical background

Inter-country distributional effects of FDI are unclear

FDI shifts financial resources from one country to another and changes the distribution of income within countries. The inter-country effect is described by the interest rate parity. Assuming an identical technology parameter, this theory states that capital flows into the country with the highest marginal productivity of capital, which results from the lowest capital endowment [Hemmer (2002), p. 321]. In comparison to developed countries, developing countries are relatively capital-poor, hence capital flows from developed to developing countries would be expected. The resulting increase of the capital availability in developing countries would decrease their marginal capital productivity. A lower remuneration of capital, meaning a lower interest rate, is the consequence, because capital then also has to be used in less productive ways. Furthermore, a shift from labor-intensive to capital-intensive production takes place so that the productivity of labor and its factor payment, i.e. wages, increase. According to the fact that the reverse effect will be observed in developed countries, an equalizing adjustment of the marginal productivities and the corresponding factor payments to labor and capital in developing and developed countries occurs. According to the simple interest rate parity, an equalizing effect of FDI on the worldwide functional income distribution is to be expected. But the motivation for capital flows is not only based on the current interest rate differences. As indicated by the extended interest parity, short-term exchange rate expectations and certain risks are important as well. This explains why it could be more rational to invest in a low interest rate country, where political and exchange rate risks are lower [Bofinger et al. (1996), p. 313; Hauskrecht (2001), p. 16]. Therefore, the effect of FDI on the functional income distribution between countries is not clear.

[3] There is still widespread consensus on the positive growth effects of FDI even though there is an increasing number of citical voices. For a review of the arguments see Mold (2004).

Empirically the huge wage differences between countries seem to disprove conventional theory on openness and factor price equalization. Several studies suggest though, that there is more wage equalization between countries than the raw data reveals at first sight. These studies show that wage differences can be explained largely by differences in productivity and purchasing power parities [Rama (2003), pp. 2-3] and find a strong correlation between wages and productivity. As FDI increase productivity, there is a case for wage increases in developing countries via FDI, which would decrease inequality between countries.

Wage effects of FDI within countries can be unfavorable for unskilled workers

International capital movements do not only cause distributional effects between countries, but also within a country. Due to the limited capital endowments and the abundance of labor, an unequal functional income distribution is characteristic for developing countries. The high concentration of capital combined with high interest rates and the abundance of labor (resulting in low wages) lead to an unequal personal income distribution. Capital imports like FDI decrease interest rates and increase wages so that a positive shift in the functional income distribution occurs. As this shift benefits labor and discriminates only the few owners of capital, the effect of capital inflows on the personal income distribution should, theoretically, be likewise favorable, i.e. equalizing.

Empirically, this relationship could not be confirmed on general grounds so far. There is evidence though, that the short-term impact of FDI on average wages is positive while this effect fades over the next few years. Rama [(2003), p. 6] comes to this conclusion with the help of a model explaining the level of wages as a function of the FDI to GDP ratio, controlling for country, occupation and year. But FDI also increase the level of wage dispersion by occupation in developing countries, thus contributing to a source of income inequality [Rama (2001)]. Even though popular international trade theory suggests a decline in the wage premium to education, exactly this seems to be the case for FDI. Rama [2001] estimates that for an extra one percent of GDP in FDI the wage per year of schooling increases by 0.8 percent in the subsequent year. Even though this effect will fade once the supply of more educated workers increases, in the short run this leads to more wage dispersion and thus more inequality in developing countries.

Other empirical studies also found evidence of FDI having negative effects on the income distribution of developing countries [e.g. Beer/Buswell (2002)]. The reason lies in the character of FDI, which is not only a simple capital transfer, but a bundle of human capital, know-how, and technology. The expected balancing effect of pure capital flows on the personal income distribution and, therewith, on poverty is confronted with other impacts of FDI, causing a change in the requirements on workers. FDI leads to more capital-intensive production processes [Hiemenz (1990), p. 90]. On the one hand, this increases the demand for human capital and, therewith, its remuneration, but on the other hand, it causes a decrease in the demand for unskilled labor and its remuneration in developing countries. Better technologies will therefore lead to a dualization of the job market as known in developed countries. Well-trained specialists will realize top salaries, while unskilled workers earn only very small wages [Nunnenkamp/Spatz (2001)]. Therefore, FDI could theoretically raise inequality because the described negative wage effects may hurt the income of the poor. The evidence on positive wage effects cited above does only take into account wages, thus not addressing the question of job creation and job destruction.

Short- and medium-term job-creating effects of FDI in a country depend on the mode of entry

FDI affects not only the remuneration of capital and labor, but also the number of employees. This fact is of special importance for the poor, because they usually only possess their own unskilled labor and have only little or no physical or human capital as an alternative source of income. In developing countries the most important effect of FDI on the poor is therefore the creation or destruction of jobs [IFC (2000), p. 16].

In the short and medium-term it must be distinguished between direct and indirect effects. The direct job-creating effect of FDI depends, above all, on the mode of entry. In case of greenfield investments, additional jobs will be created surely so that a positive direct effect of FDI can be observed. The direct effects in case of a takeover are not clear, even though there are several indications that they are negative. For example, the introduction of new production technologies often contains rationalization activities, resulting in the displacement of labor. In other cases the subsidiary is forced to reduce the production volume, so that parts of the enterprise must be closed. It is also conceivable that production and employment expand through FDI [UNCTAD (1999), p. 261 and (2000), p. 182]. The decisive question whether FDI leads to job creation or destruction is the degree of labor-intensity of the production process used by the multinational corporations in the host country [Gillis et al. (1996), p. 404]. To attract relatively labor-intensive FDI, it is beneficial for developing countries to create a FDI-friendly environment and an export-oriented trade regime. Simple manufacturing activities, especially, which are designated for export, can create many jobs for unskilled workers [UNCTAD (1999), p. 263 and UNCTAD (1994), p. 209]. Some countries achieved very positive job creation results by introducing export processing zones, e.g. Mauritius, Dominican Republic and Costa Rica. As young women hold many of these jobs, a side effect is also the narrowing of the gender wage gap [Rama (2003) pp. 12-17]. Oostendorp [2004] in fact finds a narrowing of the gender wage gap for low-skill occupations as a result of FDI in a paper utilizing information from the annual ILO October Inquiry over the period 1983-99 and analyzing this information in cross-country OLS regressions.

The World Bank [(1995), p. 74] estimates that between 1985 and 1992 multinational enterprises created eight million jobs directly, five million of which in developing countries. New estimations state a direct job-creating effect between 17 and 26 million jobs by the middle of the 1990s [UNCTAD (1999), p. 264]. Although these estimations have to be interpreted very carefully a positive, direct influence is undeniable, but the larger part of the job creation is assigned to the indirect effects of FDI, which are assumed to be up to twice as high as the direct ones in the manufacturing sector [UNCTAD (1994), p. 192]. Positive, indirect effects occur mostly in preceding or subsequent processing stages, if the multinational enterprise is well integrated into the local market [Lall (1995), p. 524 and Tuan (1999)]. On the other hand, negative, indirect effects, like the displacement of local competitors, can occur, whereby this crucially depends on their competitiveness [Lall (1995), p. 525 and UNCTAD (1999), p. 261]. The worst case is when domestic companies with traditional labor-intensive production would be replaced by capital-intensive producing multinational enterprises so that more workers are laid of than hired [Radke (1992), p. 51 and Altvater/Mahnkopf (1996), p. 267]. Such a labor-saving effect is often strengthened by a shift of demand structures towards capital-intensively manufactured goods caused by advertisement and international demonstration effects [Hemmer (2002), p. 186]. Even though the displacement of domestic workers could be used for an efficiency-strengthening and competition-promoting restructuring. This could lead to a stable and/or expanded employment in the future [UNCTAD (1999), p. 261].

Long-term, job-creating effects of FDI are good for equality, if the poor hold human capital

In the long term, FDI leads to an acceleration of technical progress. The strength of this effect depends not so much on the initial technology transfer itself, but on the speed of the ongoing technology upgrading, as a result of the integration of the subsidiary in the multinational enterprise [Lall (1995)]. A faster technical progress promotes higher growth and employment. Growth is, therefore, a central prerequisite for a sustained poverty reduction, and FDI – via growth – can have a positive effect on income of the poor in an indirect way.[4]

An acceleration of technical progress, though, will also increase wages in originally very labor-rich countries. Then the direction of the long-term job-creating effect depends on how the recipient country meets the growing requirements [UNCTAD (1999), p. 263]. Technical progress needs an ongoing development of human capital, whereas the importance of unskilled labor decreases. This leads to a more unbalanced functional income distribution and, because of the high concentration of physical and human capital, to an unequal personnel income distribution in developing countries. Because of the fact that poor people have limited access to education, their chances on the job market will become worse. FDI leads to a relative high and balanced increase of income in those countries that have equally distributed education and high educational level [Nunnenkamp/Thiele (2004), p. 13]. On the other side, countries with an unequal educational distribution have to consider that FDI leads to a more unequal income distribution.

In summary, the theoretical effects of FDI on income distribution between countries as well as within a country are unclear, as mechanisms for equalizing as well as unequalizing effects are put forward. The question thus needs to be answered empirically.

3. Previous research

Just like in theory, existing empirical studies cannot agree on the effects of FDI on income distribution [Aaron (2001), p. 21]. For a small sample of FDI-projects in Venezuela Grosse [1998] could not point out a negative influence of FDI on income distribution. Krause [(1999), p. 14] assessed a positive influence of FDI on the income distribution for those countries, whose institutional and regulative infrastructure is specified to attract FDI.

A negative influence is found by Chen, Chang and Zhang [1995], who analyzed the influence on income distribution in China, as well as Ikemoto and Uehara [2000], who focus their analysis on the effects of increasing FDI during the eighties in Thailand.

More recent cross-country analysis cannot find any influence of FDI on inequality though: Bussmann, de Soysa and Oneal [2002] assess the influence of FDI on income distribution for a sample of 72 developed and developing countries in various years between 1970 and 1990 with up to 383 observations. In their OLS analysis of cross-section and time-series data they find no significant results for a correlation between FDI and inequality measured by the Gini coefficient. Milanovic [2003], assessing the influence of globalization on income deciles derived directly from household surveys, also cannot find any significant influence of FDI on income distribution.

[4] In a brief review of the existing literature Nunnenkamp and Thiele [(2004), pp. 11-13] paint a very pessimistic picture on the poverty-reducing effects of FDI though. They state that FDI will only contribute to poverty-reduction as far as it contributes to economic growth, which in turn will reduce poverty eventually. But even for the growth enhancing effects of FDI certain conditions, e.g. a minimum level of labor force qualification, have to be fulfilled, which are mostly not met.

Most similar to the approach we will follow is the one by Tsai [1995]. He shows that FDI leads to a more unequal income distribution, but if regional dummies are incorporated only for Asia a negative influence is observed. The sensitivity to the inclusion of regional dummies suggests that the correlation observed before is more a reflection of regional differences in inequality than due to an observable influence of FDI on inequality.
The most important result of Tsai's estimation without regional difference is the significant positive correlation between the Gini coefficient as an indicator for inequality of income distribution and the stock of FDI: More FDI leads to an increase in income inequality.
Since differences between regional groups of countries played such a decisive role in Tsai's results, we will revisit the regional differences and also introduce two additional ways of differentiation between country groups.

4. Model

After the re-estimation of Tsai's approach with new data the regression will be repeated including regional, income and export focus dummy variables. According to Tsai's basic model the *Gini* coefficient as an indicator for the inequality of income distribution is regressed on the following variables describing it's potential causes:

- Logarithm of GDP per capita in international prices from 1975 (LNPCGP) and the square of LNPCGP (LNPCGP2)
- Ratio of the FDI stock to GDP times 100 (FDIS)
- Ratio of public expense to GDP times 100 (GOV)
- Ratio of agricultural employment to the all-over working population (AGRIL)
- Ratio of the sum of exports and imports to GDP times 100 (TRADE)
- Average annual growth rate of GDP per capita for the last three years (GPCGP)
- Illiteracy rate (LIT)

In difference to Tsai's approach the secondary school enrolment (SEC) indicator, used as one of two human capital indicators, is eliminated because of its limited availability and explanatory power
Based on these variables the following estimation equation can be formed:

$$GINI = c_0 + c_1 LNPCGP + c_2 LNPCGP2 + c_3 FDIS + c_4 GOV + c_5 AGRIL + c_6 TRADE + c_7 GPCGP + c_8 HCAP + \varepsilon$$

Following this equation the relevant data set contains 139 observations. According to *Tsai* the four following partial samples were build:

- Sample 1 (all except for six influential outliers) includes 133 observations.
- Sample 2 (cases of FDIS > 100 or FDIS < 1 are eliminated) includes 117 observations.
- Sample 3 (sample 2 is limited to cases of TRADE < 100) includes 100 observations.
- Sample 4 (from sample 3 all cases with GOV > 23 are eliminated) includes 99 observations.

5. Results

Table 1 shows the result of our basic analysis. The overall explanatory power is very limited with a corrected R^2 between 0,214 and 0,285, so that these results have to be interpreted very carefully.

	1.1	1.2	1.3	1.4
Independent variable	coefficient (p-value)			
Constant	130,140120	119,518855	182,175769***	186,271420***
	(0,114)	(0,167)	(0,060)	(0,055)
LNPCGP	-29,718431	-25,184986	-41,669188	-43,317244***
	(0,168)	(0,265)	(0,103)	(0,091)
LNPCGP2	2,353829***	1,996260	3,115417***	3,238741***
	(0,099)	(0,181)	(0,066)	(0,057)
FDIS	0,058851	0,043161	0,013266	-0,002840
	(0,309)	(0,459)	(0,848)	(0,968)
GOV	0,315830***	0,075637	-0,252969	-0,148818
	(0,097)	(0,712)	(0,310)	(0,581)
AGRIL	0,077471***	0,105000**	0,083578***	0,077216
	(0,082)	(0,022)	(0,081)	(0,110)
TRADE	-0,026499	-0,023957	0,026520	0,037246
	(0,153)	(0,200)	(0,571)	(0,439)
GPCGP	-0,706783*	-0,653723*	-0,854128*	-0,829969*
	(0,000)	(0,001)	(0,000)	(0,001)
LIT	-0,105765*	-0,116904*	-0,099779**	-0,099536**
	(0,010)	(0,009)	(0,036)	(0,037)
Observation	133	117	100	99
F-statistic	6,614*	4,947*	5,924*	5,936*
Corr. R^2	0,254	0,214	0,285	0,287

Table 1: Explanation of the Gini coefficient

As significant finding of the basic estimations can be stated that high short-term growth (GPCGP) is the only variable showing a highly significant coefficient in all four estimations and has an equalizing effect on income distribution. The illiteracy rate (LIT) shows a highly significant result only for the first two, and a significant one for the last two estimations. The balancing effect of a high illiteracy rate is unexpected and can be explained by the chosen country sample. Illiteracy is one of the main reasons for poverty. Education enables the poor to find new jobs and earn higher incomes. If only few people can reap these benefits the Gini coefficient increases as a consequence of an increasing literacy rate, i.e. the Gini coefficient would decrease as a consequence of increasing illiteracy. But this effect applies only to poor countries which represent the main part of our chosen country sample. In more developed countries with a correspondingly higher education level an increasing Gini coefficient is expected as a consequence of an increase of the illiteracy rate.

For the most other variables few significant results are found. An inequality-increasing effect can be attested to the rate of agricultural employment as a proportion of overall employment, even though varying levels of significance are observed, i.e. the stronger a country's focus on agriculture, the more equal tends to be its income distribution.

Furthermore, the weak significant value of the squared log of real GDP per capita (LNPCGP2) in three out of four estimations indicates that the strength of a possible, but not confirmed (LNPCGP is insignificant) inequality-raising effect of GDP decreases with an increasing GDP. Overall these results do not lend strong support to the Kuznets-hypothesis.

Estimations with regional variables

As the basic analyses show no significant influence of FDI on income distribution a regional disaggregation is introduced. As first step, following Tsai's approach, new estimations for the known partial samples are conducted using the following additional variables:

- Dummy variables for Latin America (LA) and East-South-East Asia (AS),
- Interaction variables among those and FDIS (LAFDIS and ASFDIS).

The remaining countries were used as reference group.

The results, presented in table 2, reveal that regional disaggregation increases the explanatory power. Even though the corrected R^2 lies between 0,413 and 0,478 and is twice as high as in the basic regressions the results also have to be interpreted carefully.

	2.1	2.2	2.3	2.4
Independent variable	coefficient (p-value)			
Constant	129,878320***	111,062974	84,324806	88,070162
	(0,073)	(0,152)	(0,324)	(0,305)
LNPCGP	-30,580370	-22,636573	-13,561231	-14,898417
	(0,109)	(0,269)	(0,554)	(0,518)
LNPCGP2	2,278610***	1,699554	1,033583	1,132123
	(0,073)	(0,211)	(0,499)	(0,461)
FDIS	0,118755**	0,081522	0,046903	0,032851
	(0,032)	(0,160)	(0,493)	(0,643)
GOV	0,348620***	0,163976	-0,054410	0,027732
	(0,057)	(0,422)	(0,814)	(0,913)
AGRIL	0,133910*	0,135758*	0,115921*	0,110529**
	(0,001)	(0,001)	(0,007)	(0,011)
TRADE	0,022812	0,012462	0,020951	0,028281
	(0,257)	(0,551)	(0,623)	(0,518)
GPCGP	-0,393308**	-0,302719	-0,393583***	-0,379099***
	(0,032)	(0,117)	(0,071)	(0,083)
LIT	-0,074279***	-0,127231**	-0,124343**	-0,127409**
	(0,069)	(0,013)	(0,031)	(0,028)
LA	15,331805*	11,064584*	9,732151*	9,714735*
	(0,000)	(0,001)	(0,006)	(0,006)
AS	1,672738	-3,236921	-3,554954	-3,893645
	(0,482)	(0,296)	(0,280)	(0,242)
LAFDIS	-0,445775*	-0,369429**	-0,193692	-0,205429
	(0,002)	(0,014)	(0,231)	(0,207)
ASFDIS	-0,228653**	-0,128031	-0,182690	-0,158469
	(0,036)	(0,270)	(0,256)	(0,333)
Observation	133	117	100	99
F-statistic	10,362*	7,813*	8,547*	8,461*
Corr. R^2	0,460	0,413	0,478	0,477

Table 2: Explanation of the Gini coefficient using regional dummy variables (part 1)

The basic results for short-term growth (GPCGP), illiteracy rate (LIT), LNPCGP2 and the ratio of agriculture employments to overall employments (AGRIL) can be confirmed. Additionally, regarding the two dummy variables, LA shows highly significant results. The positive sign indicates a higher level of inequality in this region. In comparison to the reference group a positive effect of FDI on income distribution can be observed in both regions, for Latin America (LAFDIS) at the 1% significance level and for East-South-East Asia at the 5% significance level.

Going beyond *Tsai*'s approach, the remaining reference group is divided again. Thus the following regional country groups are formed, according to the World Bank classifications:

- East-Asia and Pacific (AS),
- Latin America (LA),
- South-Asia (SOUTHA), and
- Sub-Sahara Africa (SSA).

Observations of countries from "Middle-East and North-Africa" as well as "Europe" (Turkey) remain as reference group.

The results are presented in table 3. The explanatory power of these regressions is higher than those containing no or two dummy variables with a corrected R^2 between 0,470 and 0,54.

	3.1	3.2	3.3	3.4
Independent variable	coefficient (p-value)			
Constant	2,556957	15,290398	-13,112290	-4,528078
	(0972,)	(0,847)	(0,883)	(0,960)
LNPCGP	2,870093	1,182883	12,625732	10,403195
	(0,880)	(0,954)	(0,591)	(0,662)
LNPCGP2	0,168259	0,233296	-0,655752	-0,511239
	(0,893)	(0,863)	(0,673)	(0,745)
FDIS	0,034804	0,043051	0,032060	0,017486
	(0,618)	(0,569)	(0,679)	(0,828)
GOV	0,216673	0,139974	-0,094302	-0,031172
	(0,227)	(0,502)	(0,692)	(0,902)
AGRIL	0,106092*	0,109518*	0,103607**	0,099932**
	(0,005)	(0,006)	(0,013)	(0,018)
TRADE	-0,000154	0,000121	-0,003477	0,004139
	(0,994)	(0,995)	(0,934)	(0,924)
GPCGP	-0,214906	-0,231004	-0,279653	-0,276061
	(0,223)	(0,225)	(0,196)	(0,203)
LIT	-0,076560**	-0,124974**	-0,145670**	-0,152277**
	(0,047)	(0,020)	(0,018)	(0,015)
LA	13,374122*	11,967067*	8,344318***	7,815739
	(0,000)	(0,006)	(0,076)	(0,101)
AS	-0,127204	-1,844836	-4,830413	-5,695177
	(0,970)	(0,661)	(0,291)	(0,230)
SOUTHA	-3,646596	5,328111	3,199314	3,006571
	(0,316)	(0,479)	(0,675)	(0,694)
SSA	6,302963***	6,326139	3,650156	3,048163
	(0,080)	(0,120)	(0,401)	(0,492)
LAFDIS	-0,294516**	-0,309412**	-0,149471	-0,159097
	(0,045)	(0,049)	(0,372)	(0,345)
ASFDIS	-0,054694	-0,053557	-0,171628	-0,148764
	(0,631)	(0,659)	(0,274)	(0,353)
SOUTHAFDIS	-0,305396	-2,048619	-2,222878	-2,289890
	(0,651)	(0,151)	(0,125)	(0,116)
SSAFDIS	0,061718	0,040757	0,003451	-0,002435
	(0,564)	(0,723)	(0,981)	(0,987)
Observation	133	117	100	99
F-statistic	10,693*	7,440*	7,828*	7,732*
Corr. R^2	0,540	0,470	0,525	0,524

Table 3:Explanation of the Gini coefficient using regional dummy variables (part 2)

The basic result relating to the illiteracy rate can be confirmed. LIT shows significant negative values in all four regressions indicating that the equalizing effect is not region-specific. Furthermore, the positive value of the ratio of agriculture employment to all employment (AGRIL) verify its inequality increasing effect, whereas only a significance level of 5% is reached in the last two estimations. In contrast to the previous estimations GPCGP has no significant coefficient, which indicates that fast growing countries with persistently low inequality are regionally concentrated.
According to the regressions with only two regional variables the higher inequality in Latin America can be confirmed for all four estimations, even though the level of significance varies. No robust results can be observed for the interaction variables of FDI with regard to different regions; only the coefficient for Latin America (LADFIS) in estimation 1.2 and 2.2 is significant. The overall positive coefficient for the regional variable for Sub-Sahara Africa (SSA) does not show robustness. Its weakly significant result in estimation 1.2 cannot be repeated in the following estimations because of the elimination of observations from the more income balanced South-Asia.

Estimations with income variables
The effects of FDI on income distribution are not only influenced by regional differences, but also by the level of economic development. Therefore, it is necessary to analyze differences resulting from different income levels. To assess these differences the following country groups are formed, according to World Bank classifications:

- Low income countries (LOW),
- Middle income countries – lower category (LOWMID),
- Middle income countries – upper category, and
- High income countries (HIGH),

whereas the middle income countries – upper category are chosen as reference group.
The results are summarized in table 4. Because of the lower corrected R^2 the regional classification provides more information about the differences in income distribution than the classification by income group.
The basic results of the previous investigations, regarding the ratio of agricultural employment (AGRIL > 0) and short-term growth (GPCGP > 0), can be confirmed. Because of the common positive connection between illiteracy rate and GDP per capita the insignificant coefficient of the illiteracy rate (LIT) can be explained by the significant negative values of the dummy variable for low income countries (LOW) and the mostly weak significant negative ones for middle income countries – lower category.
For income differentiated country groups no robust effects of FDI on income distribution can be observed. Estimation 3.2 and 4.2 show weakly significant results for the reference group, indicating a negative influence of FDI on the Gini coefficient. Because of the insignificant coefficient a inequality-increasing effect of FDI in low income countries seems to be expected. The influence of FDI on income distribution in middle income countries – upper category (LOWMIDFDIS) seems to be positive, weak significant in estimation 4.2 and nearly weak significant in estimation 3.2. But all these findings are not robust because they cannot be confirmed by the other estimations.

	4.1	4.2	4.3	4.4
Independent variable	coefficient (p-value)			
Constante	146,854636	101,998239	101,464032	118,188665
	(0,137)	(0,353)	(0,363)	(0,294)
LNPCGP	-28,654774	-14,937487	-13,375323	-18,806669
	(0,294)	(0,622)	(0,666)	(0,548)
LNPCGP2	2,015188	1,047112	0,920337	1,311753
	(0,279)	(0,612)	(0,663)	(0,540)
FDIS	-0,017417	-0,003950	-0,379131***	-0,410144***
	(0,895)	(0,977)	(0,096)	(0,074)
GOV	-0,053848	-0,155532	-0,248589	-0,124559
	(0,794)	(0,488)	(0,322)	(0,650)
AGRIL	0,104284**	0,116271**	0,121710**	0,116049**
	(0,019)	(0,013)	(0,011)	(0,016)
TRADE	0,056287**	0,041130	0,110328**	0,121553**
	(0,047)	(0,175)	(0,035)	(0,022)
GPCGP	-0,545067*	-0,550293*	-0,704765*	-0,693521*
	(0,006)	(0,008)	(0,003)	(0,004)
LIT	-0,038747	-0,073309	-0,068611	-0,067790
	(0,346)	(0,129)	(0,207)	(0,212)
LOW	-14,486470*	-11,836397**	-18,724615*	-18,639761*
	(0,004)	(0,026)	(0,003)	(0,004)
LOWMID	-7,113873	-8,124981***	-13,661492**	-13,154073**
	(0,120)	(0,094)	(0,021)	(0,026)
HIGH	-23,518076	-16,970197		
	(0,423)	(0,578)		
LOWFDIS	0,107530	-0,023199	0,321215	0,345044
	(0,483)	(0,890)	(0,167)	(0,139)
LOWMIDFDIS	0,007309	0,029207	0,393331	0,406744***
	(0,962)	(0,855)	(0,101)	(0,090)
HIGHFDIS	-0,046056	-0,044986		
	(0,902)	(0,908)		
Observations	133	117	100	99
F-statistic	6,180	4,120*	5,320*	5,356*
Corr. R^2	0,355	0,274	0,344	0,348

Table 4: Explanation of the Gini coefficient using income dummy variables

Estimations with export variables

As different industries offer different opportunities for income generation the question whether industry orientation of a country affects the influence of FDI on income distribution is of interest In order to analyze this question, the previous estimations will be repeated for the following country groups, which are formed with respect to country's export focus, i.e. 50% of their exports falling under one category:

- Manufacturing (MANU),
- Primary goods (NONFUEL),
- Fuels (FUEL), and
- Services (SERVICE).

Countries with a differentiated export structure are used as reference group.

The summarized results are shown in table 5.

The explanatory power of these estimations, measured by a corrected R^2 between 0,43 and 0,48, is higher than that for the estimations with income differentiated variables but lower than for the estimations with regional emphasis.

	5.1	5.2	5.3	5.4
Independent variable	coefficient (p-value)			
Constant	169,115186**	164,481313**	156,247916***	162,996731***
	(0,034)	(0,047)	(0,078)	(0,063)
LNPCGP	-40,273566***	-35,429107	-34,017109	-37,163608
	(0,054)	(0,102)	(0,146)	(0,108)
LNPCGP2	3,140230**	2,672802***	2,649905***	2,900874***
	(0,024)	(0,063)	(0,089)	(0,060)
FDIS	-0,042697	-0,092458	-0,080120	-0,101924
	(0,507)	(0,172)	(0,267)	(0,158)
GOV	0,219270	0,078252	0,059466	0,297452
	(0,239)	(0,687)	(0,796)	(0,253)
AGRIL	-0,008678	0,004593	0,003499	-0,005639
	(0,838)	(0,916)	(0,939)	(0,901)
TRADE	-0,013889	-0,025821	-0,057470	-0,049012
	(0,593)	(0,329)	(0,234)	(0,304)
GPCGP	-0,520898*	-0,440735**	-0,466594**	-0,406276***
	(0,006)	(0,023)	(0,035)	(0,065)
LIT	-0,098790*	-0,124517*	-0,122749*	-0,125247*
	(0,009)	(0,003)	(0,008)	(0,006)
MANU	-6,399463**	-10,358229*	-15,991501*	-17,137710*
	(0,015)	(0,000)	(0,003)	(0,001)
NONFUEL	4,863592**	1,876121	3,132643	3,522030
	(0,030)	(0,448)	(0,274)	(0,214)
FUEL	-6,387672	-6,426641	-7,177976***	-8,353512**
	(0,116)	(0,118)	(0,092)	(0,050)
SERVICE	1,594081	0,444022	-0,684736	3,029896
	(0,644)	(0,910)	(0,879)	(0,532)
MANUFDIS	-0,040399	0,123422	1,536849	1,748077***
	(0,767)	(0,393)	(0,148)	(0,098)
NONFUELFDIS	0,217980**	0,279235**	0,271143***	0,255478
	(0,046)	(0,014)	(0,100)	(0,115)
FUELFDIS	0,302211	0,284669	0,361892***	0,396645***
	(0,146)	(0,171)	(0,095)	(0,065)
SERVICEFDIS	-0,118110	-0,061455	0,065892	-0,191311
	(0,496)	(0,742)	(0,758)	(0,849)
Observations	133	117	100	99
F-statistic	7,921*	6,512*	6,461*	6,815*
Corr. R^2	0,456	0,432	0,469	0,487

Table 5: Explanation of the Gini coefficient using export dummy variables

The previous result relating to short-term growth (GPCGP) can be confirmed. On average fast growing countries show a smaller degree of inequality than slow growing ones. In all estimations the coefficient for the illiteracy rate (LIT) is significantly negative again which indicates that a higher illiteracy rate leads to a more even income distribution. The combination of the positive coefficient of squared logarithm of real GDP per capita (LNPCGP2) at different significance levels and the weak significant negative LNPCGP in estimation 5.1 (in all other estimations it is nearly weakly significant) indicates that the strength of an inequality-raising effect of GDP decreases with an increasing GDP per capita. Unlike in previous estimations, the coefficient of the rate of agricultural employment (AGRIL) is not significant due to the significant coefficients of some export focused dummy variables.

Concerning the export structure countries with an export focus on manufacturing show less inequality, as MANU is significantly negative in all estimations. This is probably caused by the fact that manufacturing goods are produced by countries, which already have reached a higher level of industrialization and therefore have a higher share of qualified workers in their labor force. For countries specialized on primary goods exports (without fuel) some significant positive result is estimated, but is not robust. In contrast there is an indication for less inequality in those countries achieving more than 50% of their exports with fuel. Estimations for FUEL are either weakly significant and negative or just fall short of the 10% significance level.
The effects of FDI on income inequality in the reference group show no significant results. In contrast the coefficient of countries exporting predominantly primary goods (NONFUELFDIS) shows significantly positive results in three estimations. Therefore, FDI seems to increase inequality in countries, which have an export focus on primary goods (without fuel), in comparison to those countries, which have diversified export structures.

6. Conclusion

As main result Tsai's examination states that the higher foreign capital inflows to a country the higher the country's income inequality! The intention of this paper was to proof or disprove this thesis.
In the theoretical analysis no clear direction of the effect of FDI on income distribution was found. A balancing effect of FDI on the world-wide functional income distribution is indicated by the simple interest parity but could not be confirmed by the extended interest rate parity. The wage effects and the longterm job-creating effects of FDI – both important for income distribution – depend on the existing human capital endowment. In summary the effects of FDI on income distribution are theoretically unclear. Therefore, this question needed to be addressed empirically. As previous research did only provide mixed results, new estimations were conducted. Following Tsai's approach, we re-examined it with new data. Using a cross-section analysis Tsai's results could not be confirmed.
Even with an augmented version of Tsai's approach we could not find many significant effects of FDI on the Gini coefficient.
Some results of regressions with a regional emphasis indicate a negative influence of FDI on the Gini coefficient in East and South East Asia as well as in Latin America. But this relationship is not robust. Furthermore, we found that in countries exporting primary goods (without fuel) the effect of FDI on the Gini coefficient is significant and negative.
In summary we could find only little significant results. This leads to the conclusion that there are no general effects of FDI on income distribution. This may not be true for each and every country or for each and every investment, but on the grounds of our study no general warning about the inequality effects of FDI is justified. It seems that cross-country analysis will not yield significant results in the near future, so that efforts should be focused on examinations of the effects of FDI at the national level. Nguyen [2003] has conducted such a study for Vietnam, more such studies are needed, especially for countries with characteristics which appear to be influencing FDI's effects on income distribution, like a strong focus on primary goods (without fuel).

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